

REMARKS

This is a response to the non-final Office Action dated January 14, 2005 for the above captioned application. The Examiner has rejected all pending Claims 10-18 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,412,913 (Daniels). The Examiner alleged that the Applicants have failed to show criticality for the specifically claimed load bearing properties.

After careful examination of the cited prior art and the Examiner's rejection ground, the Applicants respectfully disagree with the Examiner.

Daniels discloses an improved self-aligning joints, which allow easier and faster installation of individual columns. The invention of Daniels does not require any special bolts to use or practice the self-aligning joints. In facts, Daniels neither teach nor suggest use of ultra high strength bolts that meet the claimed conditions to acquire the desired fire resistance. By reading Daniels, one of skill in the art would not be able to know how to make steel beam structures including those using the invention of Daniels fire resistant without using the conventional fire protection materials.

The present invention provides a steel structure having high fire resistance, where fire resistant columns or beams are secured by ultra-high-strength bolts satisfying the claimed load bearing properties including a cross-section are of a bolt shank, which provide fire resistance at a high temperature.

A high-strength bolt having, *e.g.*, tensile strength of 1200N/mm^2 at room temperature does not necessarily have a similar high tensile strength at a high temperature. Fig. 8 of the present specification shows properties of the bolt specified by the present invention and a conventional bolt (F10R-FR and F10T).

As understood from Fig. 8, shear proof stress $TS/\sqrt{3}$ at a temperature of 650°C of the high-strength bolt (F10T) for use at an ordinary temperature is 120N/mm² and that of the high-strength bolt (F10T-FR) for a fire resistant use is 189N/mm².

On the other hand, shear proof stress $TS/\sqrt{3}$ at a temperature of 650°C of the high-strength bolt for fire resistant use of the present invention is 236N/mm² or more.

Thus, the high-strength bolt of the present invention has excellent fire resistibility.

Needless to say that skyscraper may be collapsed by a fire, the effect of the high-strength fire resistant bolts of the present invention having large shear proof stress is significantly great.

As explained above, since the high-strength bolt for use at ordinary temperature can perform excellent fire resistibility by forming it under specified conditions as described in claims 10 to 18, the high-strength bolt of the present invention can be used for a bolted steel structure constructed by fire resistant steel without increasing the kind of bolts.

Therefore, it is believed that not only the *prima facie* case of obviousness has not been met but also the specification clearly supports the superiority of the present invention that would overcome the obviousness even if it met.

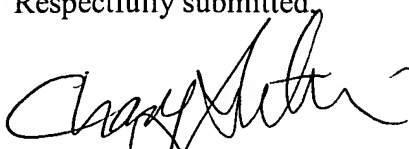
Kind consideration of the amendments and the arguments and allowance of all pending claims are respectfully requested.

Applicants do not believe that this submission requires a fee. However, if there is any fee due, the Commissioner is hereby authorized to charge payment of any fees required in connection with this submission to Deposit Account No. 02-4377.

Respectfully submitted,

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By:



Gary Butter
Reg. No. 33,841
(212) 408-2546

Chang Sik Kim
Limited Recognition
(212) 408-2678

Attorneys for Applicants
BAKER BOTTS L.L.P.
30 Rockefeller Plaza, 44th floor
New York, New York 10112-0228
(212) 408-2500